

## ABSTRACT

A micro-electromechanical device includes a substrate containing drive circuitry. An elongate actuator is fast with the substrate at a fixed end. The elongate actuator has a laminated structure of at least one inner layer and a pair of opposed, outer layers. The outer layers have substantially the same thermal expansion and elasticity characteristics. One of the outer layers defines an electrical heating circuit that is in electrical contact with the drive circuitry to be heated and to expand on receipt of an electrical signal from the drive circuitry and to cool and contract on termination of the signal, thereby to generate reciprocal movement of the actuator.